

Does the minor trauma during pregnancy have any effect on perinatal outcome?

Gebelikteki minör travmanın gebelik sonuçlarına etkisi var mı?

Neslihan Yerebasmaz, Derya Akdağ Cırık, Şirin Aydın, Mualla Koçer, Fulya Kayıkcıoğlu,
Leyla Mollamahmutoğlu

ABSTRACT

Objective: Women having major trauma during pregnancy are at increased risk for both maternal and fetal morbidity. However, the association between minor trauma and adverse perinatal outcomes is still unknown. Therefore, we aimed to analyze the incidence of minor trauma in pregnancy and effect on the outcomes of pregnancy.

Methods: The data of patients, who were admitted to the emergency service of Etilik Zübeyde Hanım Women's Health Training and Research Hospital between January 2013 and December 2014, were evaluated. A total of 283 patients (0.3%), who had minor trauma during pregnancy, were included in the study. Demographic and obstetric data were analyzed with descriptive statistics. Additionally, antenatal complications and pregnancy outcomes were evaluated in 188 patients, who were followed during pregnancy and delivered their babies at our hospital

Results: During the study period, of 105,727 women who were admitted to the emergency service of our hospital, 283 (0.3%) had minor trauma during pregnancy. The causes of minor trauma, in order of frequency, included home accidents (81.3%), domestic violence (9.9%) and traffic accidents (8.8%). Preterm delivery has been the most frequently antenatal complication observed in these patients (15.4%).

Conclusion: Home accidents and domestic violence are the most common causes of minor trauma during pregnancy, and the patients are particularly at risk during the second trimester. The patients must be cautioned regarding the risk of preterm delivery and advised to attend regular pregnancy follow-up visits due to the fact that these patients have a higher risk of preterm delivery.

Key words: Minor trauma, pregnancy, antenatal complication, preterm delivery

ÖZET

Amaç: Gebeliğinde major travma yaşayan kadınlarda hem maternal hem de fetal mortalite artmıştır. Ancak gebelikteki minör travma ile kötü perinatal sonuçlar arasında ilişki olup olmadığı bilinmemektedir. Bu çalışmada gebelikte minör travmaya maruz kalma sıklığı ve gebelikte minör travmaya maruziyetin gebelik sonuçlarına etkisi araştırıldı.

Yöntemler: Ocak 2013-Aralık 2014 tarihleri arasında Etilik Zübeyde Hanım Kadın Hastalıkları Eğitim Araştırma Hastanesi kadın doğum acil servisine başvuran 105727 hasta verisi incelendi. Hastalardan gebe olan ve gebeliğinde minör travma öyküsü olan 283 (%0,3) gebe çalışmaya dahil edildi. Gebelerin demografik özellikleri tanımlayıcı istatistiksel yöntemlerle belirlendi. Çalışma grubumuzdaki gebelerden hastanemizde takip edilen ve doğum yapan 188 hastanın bilgilerine ulaşıldı. Bu gebelerin antenatal komplikasyonlar ve gebelik sonuçları incelendi.

Bulgular: Çalışma periyodunda hastanemiz acil servisine başvuran 105727 kadından 283'ü (%0,3) gebe ve acile başvuru nedeni minör travma idi. Sıklık sırasına göre minör travmalar ev içi kazalar (%81,3), aile içi şiddet (%9,9) ve trafik kazaları (%8,8) olarak bulundu. Bu gebelerden hastanemizde takip edilen ve doğuran 188 hastanın verileri incelendiğinde en sık saptanan komplikasyon preterm doğum olarak bulundu (%15,4).

Sonuç: Ev içi kazalar ve aile içi şiddet gebelikte minör travmaların en sık nedenleridir. Gebelerde özellikle 2. trimesterde minör travma riski daha fazla bulunmuştur. Gebeliği sırasında minör travmaya maruz kalan gebelerde preterm doğum riski artmıştır. Bu gebeler preterm eylem ve doğum riski konusunda bilgilendirilmeli ve gebelik takiplerini daha dikkatli yaptırılmaları önerilmelidir.

Anahtar kelimeler: Gebelik, minör travma, antenatal komplikasyon, preterm doğum

Etilik Zubeyde Hanım Women's Health Teaching and Research Hospital, Ankara, Turkey

Yazışma Adresi /Correspondence: Neslihan Yerebasmaz,

Etilik Zubeyde Hanım Women's Health Teaching and Research Hospital, Ankara, Turkey

Email: neslihanerebasmaz@hotmail.com

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INTRODUCTION

Trauma is one of the most important causes of maternal mortality and morbidity of non-obstetric etiology [1, 2]. Motor vehicle accidents, falls, home accidents, and domestic violence are the most frequently encountered causes of trauma during pregnancy [3-4]. The incidence of trauma during pregnancy is 5-7%, and the majority of these injuries are minor traumas [5]. Previous studies showed that the rate of fetal loss was 40-50% in women who had severe trauma during pregnancy [6,7]. However, 90% of the injuries occurring during pregnancy are minor, while 60% to 70% of fetal losses are associated with minor trauma [3]. Although previous studies have established that the severity of trauma is directly related to the rate of fetal mortality and morbidity, minor trauma might also cause unexpected fetal loss, abortions, and pregnancy might become complicated by preterm birth or placental abruption [3,8,9].

Violence against women is a serious personal, social, and global public-health problem. The most common form is intimate partner violence (IPV) [10]. The prevalence of IPV is estimated to be 1%–11% in high resource countries and 4%–49% in low-resource countries [11,12]. These figures indicate that IPV is more common than other conditions that are routinely tested for in prenatal care [13], such as pre-eclampsia, which is estimated to affect 3.1 % of pregnancies globally [14].

In this study, we aimed to evaluate the incidence of minor trauma including domestic violence, type of trauma, gestational age on admission, and complications encountered during pregnancy follow-up and delivery data in pregnant women, who presented to the emergency department at a tertiary gynecology and obstetrics hospital in Ankara after having minor trauma during pregnancy.

METHODS

This retrospective cohort study evaluated the data of patients who presented to the emergency department at Etlik Zübeyde Hanım Women's Health Teaching and Research Hospital in Ankara between January 1, 2013 and December 31, 2014. Ethics committee approval was issued by the educational planning board of the Etlik Zübeyde Hanım Women's Health Teaching and Research Hospital.

All pregnant women, who experienced minor trauma undergo a standart follow-up protocol at the emergency room of our hospital. After obtaining detailed medical history including complications on admission, pregnancy follow-up data, type and severity of trauma, pre-defined laboratory tests (blood type and Rh factor, complete blood count, prothrombin time, partial prothrombin time, and fibrinogen) are performed following general physical examination, pelvic examination, and fetal ultrasonographic examination. In addition, cardiotocography is performed in patients above 24 weeks of gestation. All patients are advised to stay at the hospital for further follow-up.

In this study, minor trauma involving home accidents, traffic accidents and physical assault was defined as non-life-threatening trauma resulting in an admission to or follow-up at the obstetrics and gynecology clinic [15]. For the purposes of the present study, medical records of pregnant women, who present to the emergency room after sustaining minor trauma, were evaluated. Physical examination records, forensic medicine records and laboratory tests were reviewed. The following data were obtained from pregnant women, who presented to the emergency department after having minor trauma: vital signs, complaints, age, parity, gestational age, type of trauma, gestational age at ultrasonography, presence of fetal heart beat, and placental assessment. Additionally, medical records of the patients, who continued follow-up and delivered their babies at the study hospital, were evaluated. The following data were collected to evaluate pregnancy outcomes: abortions, preterm birth, antenatal complications (placenta previa, placental abruption, cord prolapse, etc.), and gestational age at delivery, mode of delivery, and gender of the fetus. Preterm delivery was defined as birth before 37 weeks of gestation [16].

Statistical Analysis

The statistical analysis was conducted using the SPSS 21.0 for Windows® software (Chicago, IL, USA) program. The patients' characteristics were analyzed using descriptive statistics. The data distribution was checked with Kolmogorov - Smirnov test. Normally distributed variables were described as mean and standard deviation and categorical

variables were shown as numbers and proportions. Students' t-test, Chi-square test and Mann-Whitney U test were used to compare the variables between groups. A p value < 0.05 was considered statistically significant.

RESULTS

A total of 105,727 patients were admitted to the emergency department of the study hospital in this period. Of all, 85,312 (80.7%) were pregnant. Of 736 (0.7%) patients who presented due to minor trauma, 283 (0.3%) pregnant women were eligible for the study. The mean age of the study group was 26.0±4.24 years (range: 19-31 years). The mean gestational age at presentation to the hospital was 22.5 ±9.1 weeks (range: 5-39 weeks). There were no multiple pregnancy cases among these patients. All patients included in the study were hemodynamically stable and all had blunt trauma. In the study, the most common type of minor trauma was found to be home accidents (n=230, 81.3%), followed by domestic violence (n=28, 9.9%) and traffic accidents (n=25, 8.8%) in descending order of frequency. All patients, who presented to the emergency department with the complaint of minor trauma,

were recommended to stay at the hospital for at least 24-hours of observation; only 52 pregnant women (18.4%) accepted hospitalization. There were four patients (1.4%) who had vaginal bleeding on admission. Two of these patients were at the 5th week of gestation, and their pregnancies were terminated with spontaneous abortion 12 and 18 hours after trauma, respectively. One of the patients with vaginal bleeding on admission delivered a live baby at the 38th weeks of gestation, and the other patient was lost from follow-up.

Of 283 patients evaluated in this study, 188 delivered their babies at the study hospital, and the remaining patients were admitted to other center for pregnancy follow-ups and delivery. The median gestational age at delivery was 24 weeks (ranging from 5 to 39 weeks) in women for whom delivery data were available. There was no placental abruption or intrauterine demise during follow-up. Twenty-nine patients experienced preterm birth (15.4%). No significant differences were found between the parameters of 188 patients that experienced preterm delivery compared to those that delivered at term and preterm (Table 1).

Table 1. The characteristics of pregnant who had minor trauma during pregnancy according to delivery time

Characteristics of pregnant	Preterm delivery (n=29) n (%)	Term delivery (n=159) n (%)	p value
Age (years) ¹	24.6±4.7	25.5±5.1	0.40
Gestational weeks ²	18.5 (6-35)	24 (5-39)	0.1
Parity ³ :			
Nulliparity	11 (15.9)	18 (15.1)	0.8
Multiparity	18 (74.1)	141 (84.9)	
The gestational weeks ³ of trauma			
≤ 24 weeks	18 (62.0)	79 (49.7)	0.2
>24 weeks	11 (12.1)	80 (51.3)	
Number of patients hospitalized ³	8 (27.5)	31 (19.5)	0.3
Mode of delivery ³ :			
Cesarean section	7 (24.1)	66 (41.5)	0.07
Vaginal delivery	22 (75.9)	93 (68.5)	
Gender of fetus ³ :			
Female	13 (44.8)	79 (49.7)	0.6
Male	16 (55.2)	80 (50.3)	

¹Data were analyzed with Chi-square test, ²Data were analyzed with Mann-Whitney U test

³Data were analyzed with Students' t-test

The review of forensic medical reports of 28 patients who had domestic violence revealed that the women were most frequently assaulted by their husbands (n=16, 57.1%), followed by relatives of the husbands (n=8, 28.6%) and her own relatives (n=4, 14.3%) in descending order of frequency. The median age of the assaulted women was 22 years (range: 19-37 years) and the gestational week at the

time of the assault was found to have a wide range between five weeks and 38 weeks. Two of the assaulted women had miscarriage at the 8th weeks of gestation and six patients had preterm delivery (26.1%). None of our patients had placental abruption. Perinatal outcomes of the patients, who were subject to physical assault, are shown in Table 2.

Table 2. The perinatal outcomes of pregnant women according to the gestational weeks who had domestic violence during pregnancy (n=23)

Gestational weeks of assault	Abortion	Preterm delivery (≤ 37 weeks)	Term delivery (>37 weeks)
4-12 weeks	2 (25.0%)	1 (12.5%)	5 (62.5%)
13-26 weeks	---	3 (37.5%)	5 (62.5%)
27-40 weeks	---	2 (28.6%)	5 (71.4%)
Total	2 (8.7%)	6 (26.1%)	15 (65.2%)

Percentages are given as " row percentage"

DISCUSSION

Controversial data have been published in the literature regarding pregnant women who had minor trauma during pregnancy. Although studies have demonstrated negative effect of minor trauma on the pregnancy outcomes [5,17], some studies reported no effect of minor trauma on pregnancy outcomes [15]. In the present study, home accidents and domestic violence, as being the causes of minor trauma, were more common in contrast to the findings of the studies in the literature [8,18,19]. Due to the fact that the study center is a specialized obstetrics and gynecology hospital, injured patients after motor vehicle accidents are primarily admitted to the emergency departments of hospitals that include multiple disciplines, and this may have reflected to the current study results. However, the present study found increased rate of preterm delivery consistent with the current literature [8,18,19].

Home accidents during pregnancy often involve blunt trauma and falls. The pregnant women are more likely to sustain falls during pregnancy due to orthostatic hypotension, growth of the abdomen, pelvic joint relaxation, and decreased fatigue strength, which become more prominent in the third trimester [17]. Blunt abdominal trauma is often the chief complaint of pregnant women who had minor trauma during pregnancy. In the presence of anteriorly localized placenta, blunt trauma to the abdomen may cause subclinical chronic placental abrup-

tion [18]. This may in turn result in preterm birth and delivery of a low birth weight baby. However in our study blunt trauma and falls were the most common minor traumas (n=230, 81.3%), there was no placental abruption. But 15 (6.5%) patients had preterm delivery. The follow-up protocol for these patients might be recommended closely to prevent preterm delivery.

The exposure to violence during pregnancy negatively affects both the mother and the fetus. Preeclampsia, vaginal bleeding, miscarriage, weight gain during pregnancy, hypertension and depression were found to occur more frequently in pregnant women who experience violence during pregnancy. In addition, the risks of prematurity, low birth weight, neonatal complications, fetal demise and neonatal mortality have been reported to be higher [20-22]. Because reporting the experience of domestic violence or assault is traditionally not an acceptable behavior in Turkey, and many women refrain from reporting this important problem and these cases are often present to the emergency department complaining of home accidents. The incidence of exposure to violence during pregnancy is reported to vary from 1.2% to 51% in the literature [23-24]. In the present study, 9.9% of the patients reported physical assault. However, 57% of these patients reported that they were subject to violence from their husbands, and a considerable number of patients reported violence from their own relatives (14.3%). Various studies in Turkey reported a rate

of domestic violence ranging from 2.3% to 24.8% [25-26]. Incidences of preterm birth amongst women who had been exposed to violence during pregnancy was found to be 26.1% in this study, while the rate of preterm birth was 37.5% in pregnant women exposed to assault during the second trimester.

In a study by Hyde et al. that evaluated pregnant women who had motor vehicle accidents during pregnancy, injured pregnant women were found to be younger and have disobeyed traffic rules, had a lower level of education and higher rate of smokers [6]. In the present study, none of the patients were beyond 35 years of age, and the mean age of the study patients was 24 years and we had no data about educational status of the patients, therefore no speculation can be made in this regard. While the incidence of traffic accidents in our study was 8.8% (n=25), the preterm delivery rate in this group was 8%.

When pregnancy outcomes are evaluated, minor trauma was found to be associated with preterm birth, while major trauma was largely associated with preterm birth, placental abruption, uterine rupture and maternal death, particularly during the third trimester of pregnancy [8]. Fischer et al. found that the rates of fetal demise and prematurity were higher among pregnant women who were discharged after observation in the emergency department without admission to the hospital during the first and second trimester of pregnancy [17]. Kady et al. found that preterm labor rate increased by 2.7 fold, while preterm delivery rates were reported to have increased by 20% [18]. When delivery data in the U.S. is evaluated, preterm birth rates were reported to be 11.72% [27] while this rate is reported to be 5 -10% in Europe [28]. The reported rates of preterm birth in Turkey is 11.01% [29] the corresponding rate in the present study was found to be 15.4% among pregnant women that sustained minor trauma. According to this data, patients with a history of minor trauma during pregnancy can be considered to have a higher risk of preterm birth compared to women who are not in the risk group.

One of the most serious complications of minor trauma in pregnancy is fetal loss. Fischer et al. reported that the rate of fetal loss was as 0.5% [17]. We encountered a total of 6 (2.1%) cases of miscarriage following minor trauma during the first trimester

of pregnancy. Those pregnant women aborted the fetuses in the first 24 hours following the trauma. Therefore, it is important that these patients should be hospitalized for the first 24 hours. In a study by Garmi et al, 512 pregnant women that sustained minor trauma were evaluated and no difference was reported between the control and trauma groups in terms of the rate of placental abruption [15]. Similarly, none of the patients in the present study had placental abruption or intrauterine fetal loss. But women who experienced physical violence during pregnancy were more likely than those who did not experience physical violence during pregnancy to have a perinatal mortality and neonatal mortality [30].

There are some limitations of this study. The retrospective study design and the fact that some patients were lost to follow-up after minor trauma for whom there is no further data were the main limitations. On the other hand, having significant number of patients when compared to other studies conducted in Turkey and detailed information on violence were the strengths of this study.

In conclusion, there is an increased risk of fetal loss and preterm birth particularly in the early period after minor trauma and physical violence during pregnancy. Therefore, it is important to closely observe and monitor these patients especially in the early period of having minor trauma. These women must be informed of the risk of preterm delivery and placed on follow-up.

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